SCIENCE

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CURRENT NOTES ON ANTHROPOLOGY.—NO. XXXVIII.

(*Edited by D. G. Brinton, M. D., LL. D., D. Sc.*)

Origin and Distribution of Maize in America.

THE best study which has yet appeared on maize, both from the botanical, historical and economic points of view, is one recently published in Vol. I. of the "Contributions from the Botanical Laboratory of the University of Pennsylvania," by Dr. John W. Harshberger.

With regard to its origin, he traces it to the highlands of Mexico, somewhat south of the twenty-second degree of north latitude. He believes that from that point it was introduced into the area of the United States from two sources, from the tribes of northern Mexico and from the West India Islands. The Pueblo and northern Mexican tribes derived it from southern Mexico. It penetrated to South America by way of the Isthmus of Panama, whence it extended southward along the great Andean system until it reached the Gran Chaco, where we find the native tribes, no way related to the Kechuas of Peru, borrowing its name, as they doubtless did the cereal itself, from these cultivated people. South American words for maize extended all over the West Indian Islands, showing that it was introduced to this archipelago from the southern continent.

These results are new and most interesting. The statement that the Caribs introduced it into Florida, and that the Antillean word for maize was found in Florida, or in the area of the Gulf States, is an error derived from old authorities whose assertions are now considered unreliable.

The Caribs.

APROPOS of the questions about the Caribs, their original home and their lines of dispersion (see *Science*, Dec. 27, 1893, p. 361), the whole subject is most ably and satisfactorily presented in the recent volume of Dr. Carl von den Steinen, entitled "Unter den Naturvölkern Brasiliens." It is a handsome book, large octavo, with thirty full-page plates, and 160 illustrations in the text, of 562 pages, and containing eleven vocabularies of the native dialects. It is based upon the author's observations and studies in his second expedition to the head waters of the Schingu River, in the years 1887 and 1888.

Besides the narrative of the expedition, the work contains a very complete anthropological description of the native tribes encountered, especially those of the Carib stock. He sets forth their arts, traditions, mental and physical peculiarities, costumes, etc., with desirable fullness. The question of the primitive home of the Caribs is answered by an admirable linguistic analysis of the numerous dialects of the family, and the changes in phonetics and grammatical forms which they underwent in their long separation from the mother tongue. For this the author was peculiarly well prepared by his patient and fruitful investigations of the Bakairi dialect, probably the most primitive in its form of any, reference to which was made in one of my previous notes (*Science*, Aug. 26, 1892).

Those who wish to obtain the latest and the most trustworthy views about the wonderings of these redoubtable warriors should turn to the pages of this valuable book.

Basque and Berber.

THE ethnic relations of the Basques, who now to the number of a scant half million live in the valleys of the Pyrenees, partly in France and partly in Spain, have long been, and continue to be, a difficult puzzle. (See *Science*, July 7, 1893.)

The latest attempt to unravel them is by the Professor G. von der Gabelentz, whose recent loss to science is so regrettable. In an article which was issued in the proceedings of the Prussian Academy of Sciences, in 1893, entitled "Baskish und Berberisch," he institutes a comparison between these two languages and claims to show that Basque is a Hamitic tongue, related to the Berber dialects of north Africa. He believed that this relationship had not heretofore been maintained, which is an error, as so far back as 1876 Dr. Tubino, of Madrid, in his "Aborigines Ibericos," compared the two idioms for the same purpose.

Several of the analogies presented by both these writers are certainly so close and so striking that it seems unreasonable to attribute them to chance; but if they are real, do they establish the claim of a descent of the Basque from the primitive Hamitic stock? No; because they are of such a character that they might well have belonged to the class of loan-words and have been borrowed from the large colony of Berber descent which there are cogent reasons to believe peopled much of the Iberian Peninsula in remote semi-historic times. The modern Basque has borrowed enormously from French and Spanish, and so did ancient Basque from Berber and Celtic dialects.

Micmac Studies.

THE late Rev. Silas T. Rand was for forty years a missionary among the Micmac Indians of Nova Scotia. He was a versatile linguist and acquired a more thorough knowledge of their language, traditions and mode of life than any white man had previously attained. In the later years of his life he compiled an extensive dictionary in two parts, Micmac-English and English-Micmac. The Government of the Dominion undertook its publication, but the author died after the first part only had passed through the press. The second part remains in manuscript in the possession of the Dominion Government, and it is not likely to see the light in print for a long time to come, if ever.

Mr. Rand took especial pleasure in collecting the tales, legends and myths of the tribe from the old men and women who recollected them from a long time back. He

wrote these down word for word from the lips of the narrators in their native tongue, and at his leisure afterwards translated them into English. Some of them were obtained by the distinguished folk-lorist and poet, Charles G. Leland, and published in his "Algonquin Legends." A much larger collection of them, filling a volume of 452 pages, has just appeared in the Wellesley College Philological Publications, entitled "Legends of the Micmacs," with a most satisfactory preface by Miss Helen L. Webster. It is a work the reading of which is both delightful and instructive, and it leads us far into the psychology of these children of nature. The original Micmac of most of these tales is still in existence, and should some day be printed for its linguistic value.

PLEA FOR TEACHING THE HISTORY OF MATHEMATICS.

BY JOSEPH V. COLLINS, PH.D., WOOSTOR, OHIO.

THE time alloted in our schools for the study of political and general history, as is well known, is all too short. Doubtless many teachers on seeing the title above would be disposed to say that it is well enough, but how can the teacher of mathematics find time for it? And, besides, if a little history is a good thing in the mathematics, why would it not be equally desirable in language and science? A fair answer to the latter question presents itself, viz.: Perhaps it would.

It is not surprising that the history of mathematics is neglected in the common schools, because the normal and training schools do not concern themselves with it. The latter have some excuse for this course, since the colleges, from whence they draw their teachers, either pay no attention to it, or only the scantiest, and that indirectly. It is fair to suppose that in a large number of cases the college student of to-day gets his knowledge of Greek mathematics, not from the mathematical department, but out of his Greek studies, and in a crude and confused form. He knows, or, of course, ought to know, that the elementary geometries in use now are merely Euclid's in substance, superior to Euclid's in some ways, but in others less logical. If he were asked to describe the Greek mathematics, or to tell when algebra was first cultivated, it is doubtful whether he could give any satisfactory answer. Indeed, some very interesting statistics could no doubt be secured if these and a few other like questions were put to the seniors in our various colleges. It is doubtful whether the majority would know whether algebra was studied first in the fourth or fourteenth century, or whether trigonometry was cultivated for its own sake at first or as an auxiliary to another science, and if the latter, what science? That effect, whether great or small, the invention of cartesian co-ordinates had on the development of geometry? Whether our present notation in algebra was fixed by a few or by many hands? Or the answers to numerous questions as important as these. Those who had traversed the ground of a good history, besides securing a much clearer comprehension of subjects they had taken years to learn, would have become acquainted with the evolution of a branch of science from humble beginnings and with slow steps, and indirectly would have had a good side-light thrown on general history.

Even in our universities, if one may judge by the courses set fourth in their catalogues, there is no distinct provision or requirement to secure a knowledge of the history of mathematics, *and so it would seem just to charge neglect of the historical and unifying side of the study of mathematics all* along the line of our educational system. Of course there are exceptions to this. Cajori in his "History and Teaching of Mathematics in the United States" (page 163) says: "One feature of the mathematical instruction at this institution [Princeton] that has been in vogue during the last ten years (perhaps longer) is, we think, to be recommended for more general adoption. Considerable attention is given to the study of the history of mathematics. The writer has before him examination papers, written in answer to questions set by Halsted in 1881. From the answers we infer that questions like these were asked: Who wrote the first algebra that has come down to us? What was its nature? What part did the Hindoos play in the development of algebra? Its growth during the Renaissance? The laws underlying ordinary algebra? etc." The same book gives the following in the mathematical courses in the University of Texas, where Professer Halsted now is: "In the higher classes will be discussed the history and logical structure of the mathematical sciences." Lectures on the history of mathematics are given also at the University of Virginia. No doubt other instances might be found of historical courses offered, but on the whole this is the exception. It seems scarcely necessary to criticise this condition of affairs, as I presume almost anyone would agree that it is unfortunate. It is likely that it is due to the fact that each professor is a specialist and is unwilling to take from his own work the time necessary to prepare such a general course.

The present seems an opportune time to bring forward the claims of this special study, since a new history of mathematics by an American author (Professor Cajori) is soon to appear from the press of Macmillan & Co. So far as the writer knows, it will be the first of its kind to be brought out in this country. It is to be hoped that if the book proves worthy, which it no doubt will, it will have a large sale among college professors, and also among teachers of more elementary mathematics. It will be a mistake for the latter to conclude that they can make no use of such a book. For along with enlarging their views of mathematics, they will find many facts of interest, many old principles new to them, some ideas of prime importance for the proper teaching of scientific geometry, algebra, trigonometry, and analytics, and much material—some stories, perhaps—that may be used to break the monotony of class-room routine. A teacher who does not know what was the controlling idea in the Greek geometry, or one who has never appreciated the difficulty met with in the study of incommensurables, or in attaining a satisfactory theory of parallels, is hardly in position to teach elementary geometry as it should be taught. Many of the results of mathematics, dry and abstract though they may seem from one standpoint, are yet full of interest when viewed as a part of the development of the subject, or when the circumstances under which they were discovered are known. Sometimes a knowledge of the personality of an author of a work, or a demonstration or problem, adds interest to its study. The stories concerning the legend over Plato's door, Archimedes and the Roman soldier, and Newton's apple, are not the only ones that may be related even of these men,—may their shades forgive us for having harped on them so long,—for one and perhaps two of them are apocryphal. But one of the best results of a study of this history by the teachers of elementary mathematics would be the enlarging of their mathematical horizon. Too many even at the present time think that the mathematics that lies beyond a knowledge of the elements of the calculus as set forth in our ordinary college courses is of a transcendental and non-useful character. It is safe to say that by as much as a teacher's vision is widened and clarified, by that much is he made a more intelligent and capable instructor. We enter a plea therefore for a better knowledge of the history of mathematics, hoping thereby to secure a better knowledge and teaching of the subject itself.

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THE KARIFS AND INSULAR CARIBS.

BY JOHN GIFFORD, SWARTHMORE COLLEGE.

THE word "Carib" is very elastic in meaning. It is applied in Spanish America to any wild and savage tribe. Originally it referred only to the natives of the Lesser Antilles and the South American mainland. The words "Carib" and "cannibal" are probably mispronunciations of their proper name *Karina*. The pure Caribs are represented to-day by several tribes in South America and a remnant in the Caribbee Islands. Throughout the American tropics there are Carib mixtures. In Spanish and British Honduras there are many black Caribs. The early Spaniards applied the term *grifos* to the crosses between Negro and Carib, probably because of the frizzled nature of their hair. This word has been frenchified into *griffe* and is now applied also to mulattoes in Louisiana.

In Froude's "English in the West Indies" there are many reckless statements, examples of which are that Pere Labat discovered from the language of the Caribs that they were North American Indians, that they called themselves *Banari*, which means "come from over sea," and that their dialect was almost identical with what he had heard in Florida. There seems to be little foundation for this statement. There are reasons for believing that the Caribs of the Lesser Antilles migrated from northern Venezuela and that they spoke a dialect of the language of the mainland Caribs.

According to the Spaniards the Caribs of old were exceedingly fierce and corrupt, but these statements, as well as others concerning their language, are controverted. Dr. Wilson calls them the "historic race" of the Antilles, and Peschel speaks of them as an "extraordinarily gifted race, both physically and intellectually, whom we must not condemn too severely for their complete nudity, their inclination to piracy, their craving after human flesh and the poisoning of their arrows." Some of the highest and some of the lowest specimens of South American Indians are Caribs.

The mainland and probably also the insular Caribs poisoned their arrows with curare, the juice of *Strychnos toxifera*, a climbing plant of Equatorial America. The arrows were light and were blown through a tube in a manner similar to the Dyaks of Borneo. This tube was made from the stems of *Arundinaria Schomburgkii*, a plant of the grass family resembling bamboo. This plant was named in honor of Schomburgk, a famous German traveller, sent in 1835 to explore Guiana by the Geographical Society of London. Among his many interesting finds was the *Victoria regia*. He had opportunity to witness the effect of their poisoned arrows and is charged with the statement that a deer at the top of its speed when hit with such a dart drops dead at the end of forty yards.

In what follows the writer only refers to the insular Caribs and the Karifs or black Caribs on the coast of the Bay of Honduras.

St. Vincent and Dominica were the principal rendezvous of the insular Caribs, although they occupied all the islands of that beautiful chain extending from Puerto Rico to the mouths of the Orinoco and raided at times Jamaica and San Domingo.

Many and bloody were the wars which the Caribs fought with the early colonists. In spite of their endurance they were unable to withstand the superior force and diseases of the Europeans, and all that is left in the Lesser Antilles is a little colony on the Island of St. Vincent.

In an old book on the "Caribby" Islands, the aborigines are described as good-looking, well-proportioned people of medium size, with mouths not overly large; teeth, close and white; complexion, orange; beards, scanty; hair long and black, and eyes black, piercing and somewhat Mongolian. This description fairly applies to the yellow Caribs still living on the Island of St. Vincent.

The original Carib looked very fierce because he wore no clothing, and dyed his body with arnotto (*Bixa Orellana*). It was called *roucou*, and in French Guiana there is a low tribe of Caribs called the *Roucouyennes*.

The Caribs of to-day are very able watermen. The boys even while very young are of an amphibious nature. They can catch a three-pence before it strikes the bottom of the bay, and think nothing of putting to sea on a fishing expedition on two logs nailed together. Even the women of the Black Caribs of Honduras bring bananas in small piroques to the ships in rough weather. They inherit this from their forefathers. The word "canoe," it is said, is of Carib origin. They were probably the first Indians to invent the sail. When the wind was fair they spread a cotton cloth; at other times it is said they rowed their canoes with oars, and even sang a song in time to the stroke, as sailors do to-day. Their piroques-of-war were often forty feet in length by six in width. Boats of almost this size, hewn from a single log, may be seen to-day in British Honduras. The trunks of the Giant Ceiba (*Bornbax Ceiba*) were used for this purpose. It is said that the word "ceiba" is a Spanish corruption of an Indian word for boat. The tree is of enormous size, but the wood is soft and not durable. It is also the Sacred God Tree of the Negroes.

Carib relics are often found. A collection was on exhibition at the Fair in Jamaica. They deftly fashioned implements and utensils from stone, bone and shell. There are two rocks in Grenada on which quaint hieroglyphics are cut. There too is the "hill of the leapers," where a hard-pressed, ill-fated band of Indians plunged into the sea. Many interesting remains were found on the Island of Amba, and these were of such superior workmanship that they reminded the discoverers of Greek patterns.

At the Jamaica Exhibition in 1891 there were six Caribs sent by the Government of St. Vincent. Three of these were types of "yellow" and three of "black" Caribs. They were engaged in basket making in the Industrial Village. At this work they are very skilful, the baskets they weave being water-tight.

The yellow Caribs form the purest remnant of the aborigines of the Lesser Antilles. The black Caribs

partake more of the characteristics of the Negro than Indian. Besides weaving baskets and fishing they raise patches of yams, casava, bananas and the like. A few fled to Trinidad when the volcano Sonfriere erupted.

The black Caribs, it is said, originated in this way: A slave ship was wrecked on the Island of Bequia. Those who escaped, together with other runaway slaves, captured Indian wives. Their progeny is the so-called "black Carib." They increased rapidly, became troublesome and finally occasioned much bloodshed. In character they were not unlike the Jamaica Maroons, the offspring of runaway slaves, who have lived for many years in the secluded valleys of that rugged island.

In October, 1776, the last Carib war was fought. Five thousand and eighty men, women and children were removed to the Island of Balliceaux from St. Vincent. The following year they were shipped to the Spanish main, but owing to revolutions, having had enough of wars and quarrels, many drifted to the coast of British Honduras to seek peace and protection under their former masters, the British.

In Balize they call themselves "Karifs." Such a name serves well to distinguish them from the Caribs of pure Indian blood.

During the past winter the writer came much in contact with the Karifs on the coast of Honduras. He left the beautiful Island of Cozumal, famous for its healthfulness and its fine-flavored tobacco, and coasted for several days along Yucutan and Honduras. The only boats passed were fruiters, fishermen carrying their catch alive in tanks to Havana, and a Norwegian bark with a load of mahogany. One looks longingly toward the site of ancient Tuloom and pictures in his mind what ruined cities may be hid in the forests of that unexplored wilderness. Although these waters are of much interest and beauty, one is menaced by constant danger, since to be cast on the reefs on one side means certain destruction, or to be washed on the sandy shore of Yucutan on the other is to fall into the hands of very hostile Indians. One draws a freer breath when he reaches the coast of Honduras. It was Christmas night when the writer arrived at Belize, the capital.

The mahogany cutters in large numbers came in from the forests, and the Karifs from the neighboring coast villages paddled into town in their light piroques. The array of color in this collection of types and rabble of merry-making people was dazzling. The moonlit streets resounded with the cries of drunken woodmen. Gaily dressed musicians marched up and down, followed by a horde of merry men and women and half-dressed children. The players rattled the loose teeth in the jaw-bone of a donkey, rubbed a piece of tin over an old cassava grater, played home-made guitars, rattled bones and beat tam-tams. Many were singing a strange melody to the tune, half humming, half pronouncing words in an unintelligible patois and keeping time by wiggling their bodies.

The festivities over, the Karifs left for their homes, and the city resumed its usual peaceful silence.

In British Honduras there are about 32,000 people; 14,000 of these constitute the Spanish element (that is, Spanish and Indian and pure Indian); there are about the same number of negroes and mulattoes; 3,000 Karifs; and 1,000 Europeans and others. The coast is mainly inhabited, the interior being mostly an unexplored wilderness.

The colored population (that is, negroes and mulattoes excluding the Karifs) are very influential citizens in Belize. Many own considerable property and marry whites. They are called Creoles, which wounds the pride of the Louisiana Creoles, since they profess to be of pure French or Spanish extraction.

The Karifs live in huts made of pimento slats covered with mud and thatched with the leaves of the Cohune palm. They hunt, fish and grow cassava, yams and maize. They also raise cocoanuts and bananas, which they sell to fruiters.

The women wear nothing but a loose, sleeveless chemise of white cotton, which reaches to their knees, and a kerchief picturesquely tied around the head. The men wear a cotton shirt, pants and straw hat.

Under the refining influence of English rule, with schools, churches, hospitals, and especially the absence of American missionaries and color prejudice, they are rapidly improving.

PROFESSOR LANGLEY ON THE INTERNAL WORK OF THE WIND.

BY C. F. AMERY, CLINTON HALL, NEW YORK CITY.

In the current number of the *American Journal of Science* there is a paper by Professor Langley, entitled "The Internal Work of the Wind," in which he gives the results of some very interesting observations on the extreme fluctuation in the horizontal speed of the wind as recorded on a light anemometer, at intervals, not of minutes, but of a few seconds only. He finds, for instance, that a conventional twenty-mile-an-hour wind will continually range from ten to thirty-miles an hour, at intervals of twenty seconds, occasionally rising to thirty-five miles an hour, or falling to a momentary lull. From these unexpected facts the Professor argues for such a necessary turmoil in the atmosphere as appears to him to furnish the factor necessary to afford an intelligible explanation of the otherwise apparently inexplicable problem of a heavy body, like a vulture, circling for hours aloft, without wing-motion or apparent effort of any kind. Further, the Professor regards this "internal force" of the atmosphere as a factor of so much importance in aeronautics that he ventures the prediction that the aerodrome of the future, by the mere change of the inclinations or aspects which it presents to the wind, will be able to achieve long journeys, even to circumnavigate the globe, with the expenditure of no more energy than is required for the necessary adjustment of its inclinations to the changes of the medium it floats in, except during calms.

Anything published by Professor Langley as the result of his careful deliberation is entitled to respectful consideration, but in the present instance I venture the assertion that he is being led away by a fallacy from his true line of investigation of this very interesting problem. His point of departure is, I think, easily traceable to a sentence embodying the expression that it would be impossible for a bird to circle in the effortless manner exhibited by a vulture under his notice, if the winds had been mere horizontal currents. This is an unsupported, and I believe it is a mistaken assumption; but leaving this for the present, I will first deal with what I consider the mechanical heresy involved in his prediction of the capabilities of the aerodrome of the future. Direct onward flight and circling involve some differences of mechanical principle. The eagle can circle upward with rigidly extended wings, but in essaying an onward course under the same conditions he must descend.

The mechanical principle of bird-sailing, that is, of gliding down an incline, may be expressed as the translation of the force of gravity into horizontal flight, by the pressure of a column of air on the under surface of the bird or artificial aeroplane presented to it at a suitable angle. The weight, with the first fall from a state of rest, gives the impulse, and the maintenance of the due angle, the direc-

tion. If at any point of its course the bird readjusts his position so as to present the full area of his wings to the line of flight, he will shoot upward, still with motionless wings, to a height of some feet, but never to the height from which he descended. I have seen an eagle at the end of a half-mile sail, glide upward ten or fifteen feet to his objective point, and I think this is about the limit he can attain without beating his wings.

Now with the aerodrome of Professor Langley's dream, if, with an initial impulse, it could be maintained on a horizontal, forward, course by adjustments of its inclinations to the internal working of the column of air over which it is passing, its force of gravity would be immediately neutralized, and its onward flight consequently arrested. A plane body many times heavier than air cannot be sustained in direct horizontal flight through the air, except by an expenditure of internal energy sufficient to propel it with a speed proportionate to the requirements of its specific gravity, qualified by its surface area.

Professor Langley will not have failed to observe, or the mention of the fact will recall it to his recollection, that sailing-birds pursuing an onward course do not maintain a horizontal line by availing themselves of any internal motion in the air, but simply by their own unaided physical energies.

Recurring now to the less clearly apprehended problem of circling, I believe that Professor Langley's argument that the bird could not circle with motionless wings in a horizontal current, requires one important qualification—he should have added "at least not if he carries his own wings level with the horizon." This the circling bird never does. He could no more circle while he did so, than a bicyclist could circle on an upright wheel. But by holding his wings obliquely to the horizontal circle of his flight, he can utilize the wind as a lifting power for about five-eighths of his course, and for propulsion also over nearly the same length, provided the wind blows faster than he flies. This is precisely on the principle on which a perforated card or messenger screws its course up the string of a kite. The wind blows horizontally but strikes the messenger obliquely. If the bird describes an oval, facing the wind only on the short course, he may utilize the wind for driving, over three-fourths of the course or even more. There is hence at every sweep an accumulation of impulse to urge it over the difficulty of sailing against the wind. At that stage, the bird can most easily adjust his wings, so as to make the opposing air lift him; the effort is required only to force himself into the wind's eye. By gliding slightly downward over the one-half or more of the course, with the wind, he acquires an impulse from the joint action of wind and gravity, almost, or quite sufficient, to drive him over the remainder of the course, and to raise him to his original level while facing the wind. If the impulse is not strong enough, the effect will be seen, not necessarily in the bird falling to a lower level, but in his circling further and further to leeward at every sweep. In fact the aerodrome of the future, although, like the bird, it may not sail a straight horizontal course without an expenditure of energy, may nevertheless, like the bird, be maintained in circling flight, in a moderate breeze, indefinitely, with a minimal expenditure of energy, not in consequence of the "internal work" of the air, but in spite of it. But while this explanation of the mechanics of circling flight renders it conceivable that, given the initial impulse, it can be accomplished in a moderate breeze without any expenditure of energy, beyond what is required for constant readjustment of the inclination of the plane, I am by no means certain that, in the case of the bird, the tail is not an important adjunct in propulsion. This obliquity of the direction of the wings to the horizon of flight is the clue to the whole mystery of circling or soaring flight.

The clue being given, the following propositions will, I think, serve to completely unravel it:

First. A bird gliding down an inclined plane owes his forward flight to the force of gravity.

Second. To maintain himself in horizontal flight, whether in a direct line or in a circle, power is necessary, first to overcome the force of gravity, second to propel him on his course.

Third. The bird flying in a direct line provides both lifting and driving power by beating his wings, as the boatman uses his oars; the circling bird achieves the same ends by trimming his wings to the wind, as the sailor trims his sails. Professor Langley suggested the solution when he argued that the power must come from the air.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all [illegible] proof of good faith.

On [illegible] one hundred copies of the number containing his communication [illegible] free to any correspondent.

The Editor will be glad to publish any queries consonant with the character of the journal.

A Curiosity in the Vegetable World.

NEAR a country roadside in Tate County, Miss., is a curiosity which is of interest to every passer-by, but is especially interesting to a student of nature.

All of us, doubtless, have observed "twin" or "double" trees, which have a common stock for some distance above ground, and which might be accounted for by the cessation of growth of the terminal bud of the trunk, and by the upward development of two branches from lateral buds. But the phenomenon I speak of is this: two large elm trees (*Ulmus Americana*) about 1/2 and 2 feet in diameter, respectively, have crossed each other, and have grown together, in this wise. The trees are about 8 feet apart at the base, and one crosses the other about 6 feet from the ground, the trees and the ground between forming a right-angled triangle; rather an obtuse-angled triangle; for the tree which is most nearly erect is inclined slightly in the direction in which the other lies. It seems that when young, or at least some years ago, one of the trees was blown up against the other, the two uniting where they crossed as solidly as if one were a branch of the other, the one growing almost upright, while the other continued its growth in a nearly horizontal direction.

The latter is, I should say, about 50 feet long, and the upper end of its trunk about 15 feet from the ground.

T. O. MABRY.

University of Mississippi, Jan. 23, 1894.

Red Ants.

A SHORT time since I read an article in *Science* concerning red ants. I wish *somebody* could tell me how to rid a building of them.

Upon our grounds are two buildings, hardly fifty rods apart, the "South Hall" being infested from garret to cellar and the "North Hall" being absolutely free from them. I can find no great difference of soil or position to account for this. Why the one building should be so infested with them and the other *not* is more than I can explain. I have tried almost every known remedy against them without success.

For weeks, even months, our rooms will be apparently clean and free from these pests. Let me bring a piece of meat on a plate into the room, set it anywhere I choose, and within twenty-four hours there will be hundreds,—if it remain over night thousands,—literally, of them covering it and the neighboring ob-

jects. I have held plates over the lamp or stove and burned them by the thousands, yet in twenty-four hours as many more would appear. Where do they come from? Leave them alone, and they will eat the refuse and disappear as mysteriously as they came. A dead bird, animal, or glass in which there has been sugar; a piece of cake or bread, even—it is just the same.

I have made some interesting observations in watching these small, apparently insignificant animals. They march in long slender lines and with the regularity of clock work. I have dropped a small crust of moist bread in the centre of a room and of a tapestry carpet, and in half a day or less found it one living, red mass of these small red ants. They seem to be everywhere. I believe they have regular scouts, always roving about, seeking food.

An ant that has found a bit of food will turn and retrace his steps until he finds a companion, they will put their heads and their antennæ, or both, together, touching each other a number of times, as if really in communication with one another (as I do not doubt they are), when the first ant will return to the food, and the one bearing the message will rove round until *he* can communicate with another ant, when *he* will return, likewise, to the same food. And so it goes on. It seems to be necessary that each communicate with some other before he can take his course to where the food is. So each communicates with another or some others. I have, in this way, seen a single ant turn the course of a procession of five hundred and over.

I have had much amusement in keeping these ants from the table of a sick person, upon which were an assortment of provisions. First the ants crawled up the legs of the table,—then I tied papers of naphthaline around the legs. This kept them off for awhile, but they soon walked fearless over the naphthaline and were up the table again. Old lemon did no good, various kinds of "sure cure" did no good; finally I cut four squares of sticky fly paper, a foot square, and put a piece under each leg. The ants came up to it, walked all around it, tried it in various places and then backed out. They would daintily step here and there upon it, feeling all about with their antennæ, and retreat again. About a dozen, and no more, lost their lives by venturing on it. But let the dust collect or the paper bend or break, and in less than half an hour the table was alive with them. They appeared in a procession orderly, and, when the food was gone, disappeared in a procession orderly. They often come from the least crack in the wall or floor in the centre of a room,—whether they crawl around the room, in and out of the chinks, or come directly from the walls in which they live, I cannot tell. I once had a nest of them between the leaves of a book catalogue in the interior of my writing secretary. When and how they came there I do not know. I could, doubtless, fill a whole issue of *Science* with the results of my watching of these interesting scavengers, for they are nothing else, but space forbids. I have had them *all over the body of a sick person*, without any attempt to bite the person and only intent upon eating or carrying away crumbs of bread left there and in the immediate vicinity. I have put food in various situations for them and watched them find it. Some kinds of food they do not touch, apparently; others they are greedy for and swarm to. Is it possible to clear the building of these pests? I call them pests, as they are so active, so abundant, and will not let food placed for others, and not for them, alone.

W. A. Stearns.

Atlanta University, Atlanta, Ga.

On the Coloration of the Ruffed Grouse.

One is rather left to suppose that Mr. J. H. Bowles believes from what he says in his article of the above title (*Science*, No. 571, p. 16) that the Eastern forms of *Bonasa* exhibit a dichromatism of plumage such as we find in the screech owls of the genus *Megascops*. This is the more likely to be so from the fact that he nowhere has stated in his article that ornithologists recognize at least two forms of *Bonasa* in New England. He simply explains his "meaning by selecting three birds from a bag taken in this vicinity (Ponkapog, Mass.), as they show to perfection the three different phases seen in this species, viz.: gray, brown or red, and intermediate." Now *Bonasa* in the matter of plumage is *not* dichromatic as is *Megascops*, but two of the forms described by Mr. Bowles are either well-recognized species or sub-species of ruffed grouse.

In his "Manual of North American Birds" Mr. Ridgway gives us the following representatives of this genus, viz.: *Bonasa umbellus*, *B. u. umbelloides*, *B. u. togata* and *B. u. sabini*. Of these I compare *Bonasa umbellus* and *Bonasa umbellus togata* with Mr. Bowles's specimens.

Mr. Ridgway.	Mr. Bowles.
B. umbellus. a^1. Paler, with brown markings on lower parts rather indistinct (except on flanks), and more or less concealed on breast and belly by broad whitish tips to the feathers, these brown markings usually without distinct edges; bars on flanks usually clear; hair, brown.	
b^1. (*B. umbellus.*) Upper parts mostly or entirely rusty, the tail usually rusty ochraceous. Hab., eastern United States, west to edge of Great Plains (?), north to Massachusetts (lowlands), south to Georgia (uplands), Tennessee, Arkansas, etc. *Bonasa u. togata.* a^2. Darker, with brown markings on lower parts very conspicuous, everywhere exposed and bordered by very distinct dusky bars; bars on flanks very dark brown or brownish black.	("The Southern form.") The phase found in the southern portions. Its fan is of a decided rufous tint, appearing in no way like that of the northern bird, except for proportions, and the transverse black bands. (These bands are always black, having a decided tinge of rufous in but *very* few cases). The tail coverts and upper parts are also of a reddish tint, the ruffs being a strong brownish red, tipped with dark brown and tinged with iridescent brown."
b^1. (*B. u. togata.*) Upper parts with more or less gray, often mostly grayish, the tail usually gray (sometimes tinged with ochraceous). Hab., eastern Oregon and Washington Territory, east to Moose Factory, Nova Scotia, Maine, etc., southward on mountains of New England, New York, etc.	("The Northern form.") "Taking the one in the gray plumage, which is the type found most commonly in Maine and the other northern parts, the fan of long tail-feathers is of a decided grayish cast, the back, upper and lower tail coverts being of the same shade. (The tail coverts and back vary in intensity to a greater or less extent in individuals). The ruffs are black throughout, with a strong tinge of iridescent green."

Of these two forms Mr. Bowles simply remarks "All things considered, the northern and the southern bird, when laid side by side, would hardly be taken for the same species." Mr. Bowles's third or intermediate form is accounted for by Bendine, in his handsome work upon "Life Histories of North American Birds," where he says: "In the New England States north of Massachusetts it (*Bonasa umbellus*) intergrades with *B. umbellus togata*, the majority of the specimens found throughout southern Maine, New Hampshire, Vermont and northern New York being scarcely referable to either form, birds found in the high lands approaching the Canadian ruffed grouse, while those in the valleys are nearer typical *Bonasa umbellus*."

The charge of Mr. Bowles that "comparatively little has been *printed* concerning the variety of colors worn by the ruffed grouse (*Bonasa umbellus*),—which seems surprising, as it is a favorite game bird,"—can hardly be sustained. It would have been better had your contributor consulted the *very extensive* literature upon this genus before he undertook to *print* his article in *Science* on the coloration of the bird. R. W. SHUFELDT.

Takoma, D. C., Jan. 23, 1894.

Late-blooming Trees.

THE remarks in a recent issue of *Science* on fruit-trees blooming in autumn are of much interest in that connection, but when it is found that many of our wild-flowers show a tendency to bloom at this season, the causes suggested seem hardly sufficient to explain the phenomenon. Some plants that bloom in spring habitually bloom again in September or October. In this class are the common blue violet (*V. palmata* var. *cucullata*) and the dog violet (*V. canina* var. *mulenbergii*). Specimens of these may be found in bloom every autumn, and often the arrow-leaved and Canada violets as well. It is not uncommon to find the red raspberry producing flowers and ripe fruit as late as the middle of October in this latitude. Among the twenty-two species of spring flowers that I have found blooming in late autumn may be mentioned *Hepatica triloba*, *Epigaea repens*, *Houstonia caerulea*, *Ranunculus fascicularis*, *Rosa blanda*, *Hieracium venosum* and *Potentilla canadensis*. When the whole list is examined it will be found that this trait of blooming twice runs through certain floral orders. The rose family (to which the fruit trees belong) is easily first, followed by violets, crowfoots, etc. The list contains few, if any, representatives of those plants that spring from bulbs, corms, or thickened rootstocks, although their buds are formed in autumn. Having a stock of food to draw upon, it would seem that these should be the first to respond to warmth and moisture. It appears to be quite rare for the trillium, dog-tooth violet, spring beauty, rue anemone or blood-root to bloom in autumn, and I should be pleased to hear from those who have found them in blossom at that season.

Apropos of this subject it may be mentioned that the blooming of plants out of season has long been considered an unlucky omen. An old saw runs, "When roses and violets flourish in autumn it is a sign of plague or pestilence during the coming year." In certain parts of the United States the blooming of fruit trees in autumn is supposed to be the precursor of a death in the owner's family. WILLARD N. CLUTE.

Binghamton, N. Y., Jan. 19, 1894.

—Mr. A. C. Cowley, of Trinity College, Oxford, and Mr. T. G. Stenning, Magdalen College, Oxford, have just left for St. Catherine's Convent, Mount Sinai, in order to continue the investigations begun by Mrs. Lewis and Prof. Rendel Harris.

Postage on Natural History Specimens.

IN *Science* for Nov. 17, 1893, p. 267, appeared a circular issued by the Academy of Natural Sciences of Philadelphia, concerning the transmission of specimens of natural history by mail between different countries. This circular asked scientific bodies in certain countries therein named to request their respective governments to favorably reconsider a proposition, made by the United States Post Office, to admit such specimens to the international mails under the rates for "samples of merchandise," this proposition having been once rejected by those countries.

In *Science* for Dec. 22, 1893, p. 348, a Canadian correspondent, Mr. W. Hague Harrington, criticises this circular as follows: "It is sought to throw the blame upon the countries in question, whereas the trouble arises solely from the fact that the United States have not yet advanced far enough to have a *parcel post*, as is in operation among these other countries. There is no difficulty in transmitting specimens from Canada to the most remote countries, but the United States by their policy make it impossible to receive or to send them. The scientific societies should exert their influence at home, and endeavor to have the United States Congress adopt the more advanced and liberal postal arrangements of the countries which your correspondents blame for their troubles."

As chairman of the committee appointed by the Academy to prepare the circular, I have obtained from Mr. N. M. Brooks, Superintendent of Foreign Mails, U. S. P. O., the following official information, which, it is believed, will sufficiently justify the means adopted by this Academy to secure the end desired. It gives me great pleasure to acknowledge here the unfailing courtesy of Mr. Brooks throughout our correspondence on this subject.

The Superintendent's letter, dated Jan. 12, 1894, reads: "With respect to the criticisms (quoted in your letter under reply) upon this Department's failure to more generally establish the parcels post service, it may be well to say that so far as *small packages* of natural history specimens are concerned, the parcel post would afford but few additional facilities over those offered in the regular mails if the rates were assimilated to those in force in Great Britain and Canada; for instance, the lowest charge in Great Britain on a package weighing 3 pounds *or less* addressed for delivery in Belgium is 1 shilling 3 pence (=30 cents), and to France 1 shilling 4 pence (=32 cents), while in Canada the charges for a pound *or less* would be to Belgium 46 cents, and to France 48 cents. While the sums named above may be low for the transmission of three-pound or one-pound packages, it must be remembered that these sums are the minimum charges and must be paid also on smaller packages, even on packages weighing only one or two ounces. If the proposition of this Department, to admit natural history specimens to the mails as 'samples,' had been adopted, small packages of such specimens would have been transmissible throughout the extent of the postal union at the rate of one cent for each two ounces, while the facilities offered by the parcels post for the transmission of larger packages would not have been curtailed. For example, under present conditions a package weighing 4 1/2 ounces may be sent from Canada to Belgium or France as *a letter* upon the prepayment of 45 cents; as a parcels post package the charge would be 46 and 48 cents, respectively; as a 'sample' the charge would be 3 cents."

It may also be mentioned that the United States *have* a parcels post to certain American countries at the rate of 12 cents per pound or fraction of a pound.

Mr. Harrington's criticism is inaccurate when he says that this Academy's circular "suggested that the various scientific bodies of the United States should use their influence to induce the governments of certain enumerated

countries to consent to such material passing by sample post." The circular, on the contrary, stated that this Academy had "resolved to address the various scientific bodies, with which it is in communication *in those countries whose governments have voted against the proposition*," and it is these societies only which the Academy has addressed on the subject. PHILIP P. CALVERT.

Philadelphia, Jan. 13, 1894.

The Climbing Habits of the Soft Shell Turtle (Aspidonectes spinifer).

WHILE making observations on Mud Creek at Ravenna, Nebraska, in the interests of the U. S. Fish Commission last August, I chanced upon an interesting sight. A dam extended across the creek which had been constructed of two-inch plank placed side by side, but instead of placing the edges all in the same vertical line the plank above had been drawn back a little each time, so that the dam presented a series of very narrow steps leading up stream. The slope was gradual, except the last two planks at the top, whose edges were placed in the same vertical line, thus making here a step of four inches instead of two, and, more than that, this four-inch step was allowed to extend out over the one just beneath it for a short distance. The dam was about twelve feet high, and the angle was enough to place the top of the dam two feet farther up the stream than the base. As I approached from below my attention was called to a soft-shelled turtle that was protruding his head from the water at the base of the dam. I did not think that such a clumsy animal would attempt a climb of twelve feet on a very poor road, but presently he ventured out, and by careful feeling was soon up two feet, but at the next step he tumbled back into the water. He was no more down when he started again, only to receive another tumble. Several times this occured, but the last time he had reached the last step, when he met the projecting four-inch step. It was too bad to see him tumble after so much hard work, but the last projection was too much for him, and down he fell twelve feet into the water. He seemed discouraged and not inclined to try it again, although I watched for some time to see what he would do. In addition to the steepness of the steps there were little streams of water flowing over here and there, some of which struck the turtle as it was climbing up.

I saw a common snapping turtle (*Chelydia serpentina*) at the foot of the dam, and while it would thrust out its head and look longingly above it did not attempt to climb.

ULYSSES O. COX.

Mankato, Minn.

A Rope of Insects.

IN response to the letter of Mr. Lynds Jones in *Science*, Dec. 29, I quote the following, concerning the family *Mycetophilidae* from the Standard Natural History, II., 408: "The larvae of one genus, at least (*Sciara*), have long been known for their gregarious habits. They are often found in dense patches under the bark of trees and, what is more interesting, when about to change to the pupa state, will congregate in immense numbers, forming processions that have been observed four or five inches wide and ten or twelve feet long. They travel in a solid column from four to six deep, over each other, advancing about an inch a minute. From this peculiar habit, they have been called the army-worm in Europe. Similar habits have been observed in this country among our species. One species of this genus (*S. mali*) is known to feed in numbers in the interior of apples in this country." This peculiar habit will be found commented upon in many other popular works on insects. JOHN B. SMITH.

Rutgers College, New Brunswick, N. J.

Note on the Shoulder-Girdle of the Man-o'-War Bird.

FOR publication in another connection, I have recently written out a complete account of the skeleton of the man-o'-war bird (*Fregata aquila*), and have been interested in what my friend Professor Alfred Newton, F.R.S., says of its shoulder-girdle in the "Dictionary of Birds," now passing through the press. In the work named, Professor Newton remarks: "In one very remarkable way the osteology of *Fregata* differs from that of all other birds known. The furcula coalesces firmly at its symphysis with the carina of the sternum, and also with the coracoids at the upper extremity of each of its rami, the anterior end of each coracoid coalescing also with the proximal end of the scapula. Thus the only articulations in the whole sternal apparatus are where the coracoids meet the sternum, and the consequence is a bony framework which would be perfectly rigid did not the flexibility of the rami of the furcula permit a limited amount of motion." (Part I., pp. 293, 294.)

At this writing I have at hand a very perfect skeleton of *Fregata*, kindly loaned me by the United States National Museum, and in it the scapulæ are perfectly free and articulate, as usual with the coracoids, and it is only the furcula that fuses with the coracoids above and with the sternal keel below. Knowing what an accurate observer and describer Professor Newton is, I repaired to the National Museum, and through the kindness of Mr. Lucas, the curator of the Department of Comparative Anatomy in that institution, I was shown the shoulder-girdles and sterna of a number of specimens of *Fregata*, but in each and all of them the scapulæ freely articulated with the coracoids in a manner common to the class Aves. We must believe then that when Professor Newton wrote out his description of that part of the skeleton of the species in question, he must have had before him an abnormal example of the bones to which we refer. My work when published will give a very full and accurate description of all the bones in the skeleton of this very remarkable species, comparing them with the corresponding bones represented by an unusually fine series of the skeletons of other *Stegarcopodes*. R. W. SHUFELDT.

Takoma, D. C., Jan. 19, 1894.

Volcanic Rocks of the Huronian.

IN Mr. U. S. Grant's interesting note on volcanic rocks in the Keewatin of Minnesota, which appeared in *Science* of Jan. 12, he writes: "That the Keewatin rocks northwest of Lake Superior are to a considerable extent composed of volcanic (effusive) material has been stated already by G. M. Dawson, A. C. Lawson and N. H. Winchell." It will be found, however, on referring to the descriptions above cited, that a large part of the formation as it occurs in the vicinity of the Lake of the Woods is actually composed of volcanic breccias and volcanic ash rocks, though materials of effusive origin are also abundant.

The breccias or agglomerates are often very coarse, and the circumstances are such as to indicate that there must have been several volcanic vents even in this region. See "Geology and Resources of the Region in the Vicinity of the Forty-ninth Parallel" (1875) pp. 51–52; *Geological Magazine*, Dec. 11, Vol. IV. (1877), p. 316; "Annual Report of the Geological Survey of Canada" (1885), pp. 49CC. *et seq*. GEORGE M. DAWSON.

Geological Survey of Canada, Jan. 24, 1894.

Secret Language of Children.

A CURIOUS instance of child language, different from any mentioned by Mr. Chrisman in a recent issue of *Science*, has come under my own observation. It was

invented and used by my brother-in-law, Mr. Philip E. Brodt, now a student in Columbia College, when he was about five years of age and living in Dansville, N. Y. While several of the ordinary forms of secret language were known to the children of that town, this language, so far as is known, was a pure invention of Philip, devised probably for his own amusement. No one spoke it but himself, though other members of the family learned to understand it. The boy spoke ordinary English like the other children, and when five years old he spoke fluently this language in addition, when it pleased him to do so. Mr. Brodt still remembers the language, and has kindly transcribed in English and his own language some verses which he was in the habit of repeating at that time.

Hillie wad pa urpmle onkey
Climbup ing ye allsto wick;
Sen he whucked pe thaint aff oll
Mit ade dim heathsi lyck.
En whin dys hiing clour he hasped
Me thonkey in hand his
Band ade warefell wo tearth frand iends
Wand ent tino ba ettler and.
Mo nore she'll hoot lis hittsle ister
Ith whis guden woon,
Mo nore pe'll hull ke thittty's ail
Mand ake yer howl fun for.
Ke thittty's ail stow nands strup aight
Ge thun lis aid saïde,
Me thonky cloes not dimb mo such
Lince sittle Dillwie ied.

Willie had a purple monkey
Climbing up a yellow stick;
When he sucked the paint all off
It made him deathly sick.
When in his dying hour he clasped
The monkey in his hand
And bade farewell to earth and friends
And went into a better land.
No more he'll shoot his little sister
With his wooden gun,
No more he'll pull the kitty's tail
And make her yowl for fun.
The kitty's tail now stands up straight,
The gun is laid aside,
The monkey does not climb so much
Since little Willie died.

While the verses have the appearance and sound of gibberish, it will be seen that the modified words are formed from those in the original by simple transpositions of the consonantal sounds beginning adjoining words or syllables, and sometimes of similar vowel or syllabic interchange, with a few minor modifications apparently for euphony.

H. L. TAYLOR.

New York.

Habits of Gray Squirrels.

I WAS much interested in reading the article by Ray Greene Huling in *Science* of Dec. 1 because it gives positive testimony to what I have always believed in regard to the habit of parent gray squirrels taking their young to places of safety. Some years ago I and my companions had a mania for raising young gray squrrels. In our hunts in the woods we found that not more than one good nest out of five contained any young, and that if we did not secure the young when first found they were always gone when we came again. We explained the great numbers of empty nests by saying that they were to put the young in when the home nest was discovered.

I have raised several young gray squirrels. They were taken from the nest when they were still blind and their tails had not yet become bushy. I fed them with milk by means of a glass pipette, holding one end in my mouth to regulate the flow. I found this apparatus much more satisfactory than spoons or bottles with perforated corks and quills.

The habits of one of my pets in particular were instructive. This squrriel was taken from the nest in the fall, and after having learned to eat solid food was allowed to run at large in the house most of the time during the winter, often being carried for hours in the pockets of some member of the family. In the spring when the doors and windows were open the squirrel was allowed to run about the place. In the course of a month or so he had built *six* different nests in as many different trees and vines around the place—one in the honeysuckle on the front piazza, one in the Virginia creeper that covers one side of the house, and the others in the spruce trees on the lawn. During all this time he was tame enough to be coaxed into the hands by the offer of nuts, etc. As the weather grew warmer our pet became quite a nuisance frcm his habit of carrying off handkerchiefs and lawn neckties with which to line his numerous houses, and from his making a store-house of the bedroom next his nest, on one occasion actually storing a lot of nuts between the sheets of the bed.

For two or three days we noticed that our pet was making a very peculiar noise, something like a scold, but yet not a scold, and that at the same time he (or she) seemed very restless.

At the end of that time he disappeared, and as our neighbors, who lived near a grove about half a mile from us, reported seeing a squirrel which came close to them to be fed, we had no doubt it was ours, which had gone to the grove in search of a mate.

In robbing the nest of the gray squirrel I do not remember to have seen the old squirrels in or near the nest when I had climbed up to it. My experience with the flying squirrel was different. I frightened an old flying squirrel from her nest and while feeling in the nest for the young, the old one actually came back to the nest, and on my climbing away from the nest she entered. This was repeated three times. I finally put the nest in my soft felt hat, and when the mother went in I closed it up and took her and the three young ones to my house. The young were afterward drowned by the upsetting of a cup of water in their cage, but not until after the mother had nursed them for three days in their captivity. I afterward got three more young flying squirrels and raised them on milk. When grown they were very tame and affectionate, but were not as lively and playful as the young grays.

D. T. MARSHALL.

Metuchen, N. J., Dec. 14, 1893.

Sassafras Trees.

I WAS much interested and rather amused by a letter in *Science*, Jan. 5, from W. J. Quick, on the sassafras, in which he says that "it almost attains the dignity of a tree in size."

I should like him to see some specimens on Long Island, although they are, as well as all large trees, fast disappearing so near New York.

When I first came here, in the woods were sassafras trees that held their own for size with the oaks and hickory; although the trunks were not quite so large their heads were held well up with their more pretentious neighbors. I have taken the logs to mill and had them sawed for lumber and used it for many purposes and was greatly pleased with it in places where strength and lightness were desirable. I call to mind a set of sassafras hay shelvings

in use for over twenty years that were never painted. They were light, strong and very durable.

Since reading the letter referred to I have put a string around a venerable tree of the *Sassafras oficinale* growing near and found its girth two feet from the ground to be 130 inches, or a diameter of 43 inches—certainly a quite dignified tree. This stands in the open field and is as broad and spreading as an oak in the same circumstances. It is very picturesque and greatly admired by all lovers of fine trees. I have known it for fifty years, and men that were old when I first knew it told me that it was just as large ever since they knew it as boys, so it would seem that the memory of man runs not back when it was not a respectable tree.

I am a great admirer of the sassafras as an ornamental tree and think the example of the English, who are quick to see beauty in our forest trees, may well be copied in planting this tree. There is only one drawback ; it is apt to sucker from the roots, although the one above referred to never does.

On the North Necks of this island are many large trees of the kind, but none I know quite so large in trunk, though much taller. N. HALLOCK.

Queens, L. I., Jan. 21, 1894.

A Brilliant Meteor.

LET me, in the hope of securing other accounts of the same phenomenon, report a remarkably fine meteor just seen by me.

As I, with a large number of other persons, was leaving the train at Newtonville at twelve minutes past six o'clock this evening a very brilliant meteor was seen to fall in the western sky.

We were looking directly west. The sky was absolutely cloudless, and the full moon was perhaps an hour high and, of course, at our backs. The meteor very much resembled a rocket or perhaps more strictly a large fire ball from a Roman candle. It came down the sky at an angle of about 45 degrees and from a point in the northwest perhaps 40 degrees above the horizon, where it first attracted our attention. It gave off many sparks and fiery streaks, which, however, remained visible in the bright moonlight but an instant. Its color was variously reported as white, blue and bluish-white. It seemed to me to be yellowish-white. It disappeared behind some buildings or a group of trees and still at full brilliancy and perhaps from 5 to 10 degrees from the horizon. From the hour at which the fall occurred and the remarkable and crystalline clearness of the sky, I am hopeful that it was observed and will be reported by many others, and that the falling body may have reached the earth before it was entirely consumed.

I have given the best judgments I can of distances in terms of degrees, but am aware that these may not be very accurate. My own impression was that the meteor was visible 5 or 6 seconds, but my nearest companion thought the time was fully 10 seconds.

The apparent rate of movement was that of a rocket after its culmination but before it has fallen very far, *i.e.*, the motion was slow as compared with that of many "shooting stars." C. H. AMES.

Newtonville, Mass., Jan. 19, 1894.

The Erilepidinæ.

IN my recently published "Families and Subfamilies of Fishes" (p. 135) appears the family *Anoplopomidæ* with the subfamilies *Erilepidinæ* and *Anoplopominæ*. In answer to a question, what is the former (and which may be repeated), I would state that *Erilepidinæ* is a subfamily for *Erilepis*, and that the generic name is simply a substitute for *Myriolepis* of Lockington. Lockington's name was given in 1880, but Egerton, in 1864, gave the same name to a Triassic genus of palæoniscoid fishes, and consequently another has to be supplied for Lockington's genus.

The *Anoplopomidæ* are closely related to the *Hexagrammidae* but appear to me to be sufficiently distinct. *Erilepis* (=*Myriolepis* Lock.) is most nearly related to *Anoplopoma*, and both undoubtedly belong to the same family. *Erilepis* is not closely related to *Agrammus*, with which it has been associated.

Myriolepis (Egerton) has been well differentiated by A. S. Woodward in the second volume of his "Catalogue of the Fossil Fishes" (pp. 430–515).

THEO. GILL.

Washington, D. C.

Fungi and Insects.

IN a late number of *Science* (No. 556, pp. 218, 219) Professor McCarthy discusses, under the head of "Fungi versus Insects," methods which have recently been largely used for the prevention of insect and fungous depredations. He seems to decry especially the use of fungicides, believing that they lead to more slovenly methods of cultivation and a neglect of hygienic plant conditions. The modern tendency is to prevent diseases rather than to await their coming and then cure them ; and Professor McCarthy seems to be arguing against one of the most potent agents which science has called to the aid of the agriculturist. There is no one to defend the practice of some grape-growers of using copper preparations so freely as to "plaster" the fruit with chemicals. The fault lies not with the remedy but with the method of applying it. If the directions given in every bulletin on fungicides be followed, there is no reason for having the fruit coated or even spattered with copper. Neither does it seem any argument in favor of abandoning the use of fungicides because they still cause a loss of $300,000,000 a year ! The question of course is, how much greater would the loss have been if fungicides had not been used at all. It has been shown in a recent bulletin of the Department of Agriculture[1] that over $30,000 was saved by only 250 growers in treating diseases of the grape alone. Other experiments have shown that many other diseases, such as apple scab, potato blight or rot, strawberry blight, etc., can be entirely prevented by the proper use of copper or other preparations. Furthermore, the argument advanced that, because the labor of one man or of two men can be vitiated by the lack of attention of a third, no good has resulted, is certainly fallacious.

It is difficult to see how "pathogenic, contagious disease-producing fungi or bacteria" can remedy matters very much as far as fungous diseases are concerned. It is scarcely probable that methods which are applicable for the destruction of insect enemies to plants, such as micro-organisms, can be used with success to destroy the fungi that may attack the same plants. While "an automatic antipest destroying agent" would be a good thing, supposing such a thing to exist, would the slovenly farmer become any less slovenly through its use ? Or would the careful farmer be any less or any more careful ? The investigations of Professor Forbes in Illinois and Professor Snow in Kansas have been instrumental in decreasing the ravages of the chinch bug and saving large sums of money to the farmer. These experiments have not, however, proceeded far enough to enable us to congratulate ourselves that we will be able to supply the necessary ammunition to destroy all noxious insects. Let us hope it will be

[1]Bull. No. 3, Div. of Veg. Path., p. 69.

so. But meanwhile there is no good reason for condemning the use of insecticides and fungicides because they have not proved to be the universal panacea for all the farmers' ills.

I believe it may be asserted without fear of successful contradiction that fungicides, and especially Bordeaux mixture, properly made and properly used, will repay many times over the cost of manufacture and application. When in addition to this we have good farming there is every reason for confidently expecting results which without their aid it would have been impossible to secure.

JOSEPH F. JAMES.

Washington, D. C., Dec. 22, 1893.

Expressions of Emotion in Birds' Song.

FROM the note of Mr. B. S. Bowdish I see that *Science* has taken up the question of expression of emotions in the "song" of birds. First of all, I hope to be allowed to refer to Severin Petersen's excellent book, "Vore Langfugle" (Our Singing Birds), published by Gad in Copenhagen, Denmark.

Then, I wish to immortalize the name of Hans, a canary bird, and a comfort to our home for about eight years. I have watched this bird, and know more about him than anybody else.

1. When I entered my rooms, and called him by name, he would say his "pip" with a sweet, whistling sound; he plainly was glad, and whenever I repeated his name his kind "pip" would sound through even three walls. 2. When he happened to see his enemies, the sparrows, or another male bird, Hans used to start a loud, shrill "song," laying his wings close to his body, while the feathers on his throat were standing almost straight out from the skin. This shrill song was different from 3, the song that came from him (*a*) when he was singing to the female or (*b*) when he sang just because he was glad. 4. If anybody scared our bird, a "pip" was heard from him, but different from that mentioned under 1. It was now uttered subdued, *sotto voce*, and with the bill *closed*; it sounded like "mi-i." This was especially the case when the bird saw a hat; there was nothing in the world of which the bird was more afraid than a hat or an umbrella. Though I am tempted, I shall venture no generalizations. When he became excited, he would sing even while eating, and so he would when he saw me. A *Dracaena* now shades his grave. Here is a question which should be taken up, like that of expression of emotion in man. Abundance of facts is noted (see the various volumes of Humboldt) and may be collected from many sources. It is a fascinating biological question which ought to be worked up *experimentally* also. I agree with Mr. Bowdish that there are many observers of birds who could not fail to see expressions of emotion in birds' song, when their heart is in their study. Stating the facts above, I hope that somebody will take up the question. I should be much mistaken if all conscious beings gifted with a voice could not express their emotions that way.

J. CHRISTIAN BAY.

Ames, Iowa, Dec. 11, 1893.

BOOK-REVIEWS.

The Ore Deposits of the United States. By JAMES F. KEMP, A.B., E.M., Professor of Geology in the School of Mines, Columbia College. New York, The Scientific Publishing Company. 1893, 256 p., ill., $4.

PROBABLY no branch of geology is possessed of so scant a literature as is that treating of its economical relations, and yet certainly no branch of this science is more deserving of notice from its highly practical bearing upon the development of a country's resources. Prof. J. D. Whitney's "Metallic Wealth of the United States" (1854) was eagerly welcomed, but while this work has become classic it has become, also, of mere historical value. New mines have been opened in regions then unknown, new resources have been discovered and new methods of metal winning introduced, while, on the other hand, deposits then of greatest value have been worked out and deserted, and this not alone in the case of individual mines but over vast fields embracing wide areas of country. It is then in the scattered literature and in the works of foreign authors that American students of to-day have been compelled to seek a knowledge of American ore deposits. Moreover, the class most in need of this information, and for whom it would have the greatest value, is precisely that class to whom, from location and other causes, this scattered and foreign literature is least available. Nor are the foreign authors exact in their descriptions of American localities; authoritative writing can only come with extended study and the personal acquaintance gained by residence. For purposes of study and reference a correlation of our literature is necessary, and this can, necessarily, be accomplished only by one thoroughly acquainted with the ore deposits themselves.

The present work by Prof. J. F. Kemp has been received with greatest applause by all interested in mining and in economic geology. Concise in itself, it supplies an exhaustive reference to original papers, and places at once in the hands of the student or engineer a key to more extended research. As stated by the author in his preface, the purpose of the book is two-fold; first, it is intended to supply a condensed account of the metalliferous resources of the country which will be readable and serviceable as a text book and work of reference; and, second, it is hoped that the work will stimulate a study of the phenomena described. In carrying out this purpose the best work of recent investigators on the origin and changes of rocks, by microscopic study, and by the artificial production of ore and gangue material, has been constantly kept in mind. An acquaintance with geology and mineralogy is presupposed, only the more general geological facts and principles being given in Chapter I., together with the geological scale and the geographical distribution of the principal geological groups. Chapter II. discusses the formation of cavities in rocks, embracing those produced by local contraction and those formed by the more extensive movements in the earth's crust. Chapters III. and IV. treat of the minerals important as ores and on the filling of mineral veins. Lateral secretion, ascension by infiltration, replacement and other theories are here ably discussed, the author rejecting the contemporaneous formation, decension and sublimation of von Cotta's summary in the *Erzlagerstatten.* The theory of electrical activity, once so popular, is given in brief at the end of Chapter V. This chapter describes in some detail the structural features of mineral veins, the changes in character of vein filling and the secondary alteration of the minerals in veins. Chapter VI., the last of Part I., discusses exhaustively the classification of ore deposits. While a systematic arrangement, such as is possible in mineralogy, would fail in the grouping of ore deposits owing to the diversity of material and lack of definite demarkations, still this subject is of vast importance, and a classification is absolutely necessary to intelligent discussion and description. The author has given in summary the various classifications which have been proposed, grouping them under the following several heads: *a.* schemes involving the classification of veins only; *b.* schemes based upon form; *c.* schemes based partly upon form, partly upon origin;

d. schemes based largely upon origin; *e.* schemes based entirely upon origin. The latter includes the classification proposed by Professor Kemp, which is in part as follows: I. Of igneous origin. Excessively basic developments of fused and cooling magmas. II. Deposited from solution, including, among other sub-divisions, surface precipitations, disseminations (impregnations), contact deposits and segregations. III. Deposited from suspension, including metalliferous sands and gravels and residual concentrations.

Part II. treats of the deposits of the various ores found in this country, including iron, copper, lead, zinc, silver, gold, aluminum, antimony, arsenic, bismuth, chromium, manganese, mercury, nickel, cobalt, platinum, tin, etc. Finally are given general remarks upon the distribution of the ore deposits in this country, with addenda relating to various special subjects. It will be seen from the above summary that the ground has been well covered, producing a most valuable manual, with a presentation of the latest theories in economic geology and a description of American mines which can not fail to be of greatest value to all interested, directly or indirectly, in these fields.

An Introduction to General Logic. By E. E. C. Jones. London and New York, Longmans, Green & Co.

This is a systematic treatment of logic intended for beginners, and is written on the lines laid down by the author's "Elements of Logic," previously published, a work more controversial and also more fragmentary in character. There is so much that is new under nearly all the topics discussed that these two books may be regarded as a distinct step in advance in formal logic, provided, of course, that the novelties do not turn out when examined to be valueless. There is a new definition of the science, a new description of the import of propositions, a new terminology for the forms of inference, several forms themselves new, a new rendering of the laws of thought and the axiom of syllogism, a new division of fallacies and a new formula and derivation for the syllogistic rendering of induction, besides subsidiary classifications, distinctions and doctrines in detail. The novelties are nearly all connected with the peculiar standpoint taken to begin with, that logic is a science of relations between propositions, followed by an analysis of the import of propositions which includes an indentity of that to which the terms are applied along with a diversity of aspect marked by the distinctness of terms. This much at least may be said for such an analysis, that whether correct or not, it is explicit on a point where most logics are confused or evasive, and this explicitness allows the subsequent rules of inference to be stated in a clearer way than ordinarily, and serves as basis for a glance at, and perhaps a contribution to, many of the bewildering and shifty problems which at every turn stay the logical wayfarer of every generation. Among the problems so treated are the qualification of the predicate, the adaptation of current words for logical terms, and the subservience of the canons of experiment to the axiom of inductive generalization.

The scope of the topics included resembles the Conceptualist plan of treatment rather than that of Mill and his school. It is thus restricted because Mill's width was purchased by a sacrifice of consistency. Mill's analysis of import was less formal, and admitted differing relations which lay on no uniform level of abstractness; and his consequent discussions wandered over the field of science arbitrarily. To Miss Jones's main outline, however, is appended a brief sketch of such of the methodology in Mill as lies outside the boundary of her own scheme, and finally a very complete index and vocabulary furnishes the student for further reading and for examinations. We regret to notice several misprints which should be removed in a second edition. Miss Jones's style of writing is eminently suggestive, though perhaps too severe to suit a superficial or unintelligent reader.

NOTES AND NEWS.

J. McKeen Catttell, M.A., Ph.D., Professor of Experimental Psychology in Columbia College, has in preparation a work entitled "A Course in Experimental Psychology." Laboratory instruction in experimental psychology is now given in the leading universities of America, Great Britain, Germany, and France, but owing to the recent introduction of the subject, there is no text-book. A laboratory handbook on the lines which have been proved useful in physical and biological science will make instruction easier for the teacher and more profitable for the student, and will permit the introduction of the subject in colleges where it could not otherwise be taught. It is to be published by Macmillan & Co.

—Probably no American vegetable product is appeciated less than the commonest and most useful of all, namely, our maize or Indian corn, which Dr. John W. Harshberger, of the University of Pennsylvania, has made his especial study for the past three years. His results have just appeared in an attractive volume which forms the second number of the contributions from the Botanical Laboratory of the University. Its botanical side is now more valuable than its study of the history of the plant and its economic importance. Dr. Harshberger has carefully exhausted the field of philology, archæology, and history in his investigation into the origin of the plant, which has hitherto been so uncertain. His conclusion, based upon a series of well-represented convergences, is that the plant originated in Central Mexico, between the 22nd parallel and the river Coatzocoalcos, and was first cultivated by the Nayas. From them it was spread southward along the entire west coast of South America, and northward over the great territory where it is now found. Light was thrown on this research by botany and meteorology, a very primitive form of maize having been found in 1890 in Mexico, which has afforded many points in the evolutionary history of the plant. Probably no part of the work would attract more attention from the average reader than the table of the principal products of the maize plant, ranging from whiskey to soap, and from paper to baskets. Improved machinery is making it possible to use every part of the plant, and its utility, as exhibited by Dr. Harshberger, is quite surprising. The economic portion of the work is a careful review of the conditions determining the agricultural prosperity of the nation, and an appeal for a wider cultivation of maize in the districts for which it is best fitted. The work is accompanied by several excellent maps and botanical charts, and has been recognized already in scientific circles as an important addition to our knowledge of American plants.

—The first volume of the new series of the catalogue of scientific papers published by the Royal Society of London is now ready. Vols. I to VI form the first series and cover the years 1800–1863, while the second series is from 1864 to 1873. Vol. IX commences the third series, which comprises the titles of papers published or read during the decade 1874–1883. They have been compiled on the same plan as the second series, and in like manner include a certain number of titles which were omitted in former volumes. The numbering of the titles of the papers of each author whose name does not now appear for the first time is consecutive with that in former volumes. The list by no means comprises the whole of the scientific periodicals, which at the present day are being constantly published in various languages, but a supplementary volume will probably be issued, in which will be catalogued all the most important papers that have appeared from 1800 to 1883 in periodicals not hitherto indexed. Vols. X and XI, completing the third series, are already in press.

—Richard L. Lull has been appointed assistant professor of zoölogy at the Massachusettes Agricultural College. Since his graduation from Rutgers Professor Lull has been in the employ of the Entomological Division of the United States Department of Agriculture at Washington, and has done special work in Maryland.

EXCHANGES.

[Free of charge to all, if of satisfactory character. Address, N. D. C. Hodges, 874 Broadway, New York.]

FOR SALE.—A small collection of bird skins, consisting of 135 specimens of New England species, most of which are in good condition and all have full data. Nearly all were collected in the Connecticut valley in Massachusetts. Price, $10. Address, H. L. Clark, 3922 Fifth Avenue, Pittsburgh, Penna.

FOR SALE.—Price $150, cost originally between $300 and $400, a microscope and following accessories: Acme (No. 2), stand and case lost, $75; Crouch, one-fifth collar adjustment and objective, $25; Tollcs, four-tenths ditto, $45; Tollcs [illegible], $[illegible]; Baush and Lamb, half solid eye piece, $[illegible]; Bausch and Lamb, acromatic condenser, $[illegible]; Hartnack Polarizer, $30; turn-table, $6; Hartnock, camera lucida, $20. D. T. Marshall, Metuchen, N. J.

TO EXCHANGE.—Works on entomology, botany and palaeontology for works on Indians and archæology. H. Justin Roddy, Millersville, Pa.

FOR SALE.—A Zertmayer new model U. S. Army Hospital monocular stand, cost $110. H. C. Wells, 151 Broadway, New York.

WANTS.

DOUBLE honor graduate in Science and Philosophy desires any suitable work in science, of the nature of teaching preferred. Address, E. A. Beckett, Trinity College, Toronto, Ontario.

WANTED.—Theory of the Earth, by Hutton. Principles of Geology, by Lyell. Manual of Geology, by Phillips. Lehrbuch der Geolgie und Petrefacenkunde, by Carl Vogt. Etudes sur le Métamorphisme, by Daubrée.

WANTED.—Second-hand books on osteology, embryology, and comparative anatomy. Send list, stating condition and cash price. Can offer a few good sets of birds' eggs if desired. R. C. McGregor, Palo Alto, California.

WANTED.—A copy of Chapman's Flora of the Southern United States. I have on hand for sale or exchange sets of the lichens of this vicinity. List furnished on application. Address, C. F. Maxwell, Box 127, Dublin, Tex.

WANTED.—Addresses of persons interested in archæology. Copies of the new archæologic journal in exchange for lists of collectors. A collection of 10,000 valuable objects, the results of my nine years' exploration in the Mississippi Valley, for sale. Price, $7,650. Warren K. Moorehead, Waterloo, Indiana.

WANTED.—Vol. Birds of the Standard or Riverside Nat. Hist. Preferred in parts. F. A. Lucas, U. S. National Museum, Washington, D. C.

WANTED.—Vols. I and II of Proceedings of the Entomological Soc. of Pha. and Vols. III to VI inclusive of Transactions of the American Entomological Soc. C. P. Gillette, Ft. Collins, Colo.

A GEOLOGIST thoroughly conversant with the geology of the Southern States desires an engagement. Has complete knowledge of the economic geology of Iron, Coal, Lignite, as well as Clay and Kaolin. Five years' experience with Geological Surveys. Address, K., 509 West Sixth Street, Austin, Texas.

Geo. L. English & Co., of No. 64 East 12th Street, New York, announce that they have added to their stock of minerals, during the past six weeks, more choice specimens than during any similar period in their history. In order to make quick sales they have marked the prices very low, and as a further temptation to customers to forget the hard times, they have decided to allow a discount of ten per cent. on all minerals sold during the month of February.